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unsaturated synthetic dieneophilic base oil, the second moiety is a structure having a diene conjugated carbon-carbon double bond and a carboxylic acid or anhydride moiety, and the third moiety is a polyhydroxy compound and wherein the anti-wear compound is made from the first moiety, second moiety and third moiety compounds selected from the group consisting of respectively in order for each anti-wear compound trimethylol propane trioleate-sorbic acid-sorbitol, trimethylol propane trioleate-sorbitol-sorbate, and trimethylol propane trioleate-sorbic acid-hydroquinone.

REMARKS

This Amendment is responsive to the Office Action dated April 24, 2002. Claims 1-36 are pending in the present application. The Examiner rejected claims 1-36. Claims 3, 13, 22 and 30 have been cancelled without prejudice by this Amendment.

1. Objections under 35 U.S.C. 132

The Examiner objected to an amendment filed November 13, 2001 because it introduced new matter. According to 37 C.F.R. 1.121 and the sample amendment format found on the USPTO web page, when making corrections to the specification, "amendments to the specification must be made by the submission of clean or new replacement paragraph(s)" and it also requires "a marked up version using applicant's choice of a conventional marking system to indicate the changes." (USPTO web page <http://www.uspto.gov/web/offices/dcom/olia/pbg/121gbullet.pdf>).

By the amendment of November 13, 2001, the Applicants are merely trying to remove duplicative text from the specification. In conformity with 37 C.F.R. 1.121, in the marked up version of the specification, the Applicants placed the text that they wished deleted in square brackets [] and the text to be maintained was underlined.

The Applicants respectfully direct the Examiner's attention to page 7, lines 19-24 and page 7, lines 26-31 of the application as filed. Lines 19-24 on page 7 are duplicative of lines 26-31 of page 7. The duplicative text was placed in square brackets to be deleted. Applicant merely is trying to remove text which, through a secretarial error, is found in sequential paragraphs.

The underlined text in the Amendment of Nov.13, 2001 is found in the original application, as filed, on page 7, lines 25-26 and page 7, lines 31-32 and is as follows: "The unsaturated synthetic base oil or an unsaturated synthetic dienophilic base oil is reacted with a second moiety. The first and second moieties form an intermediate product." Applicant respectfully directs the Examiner's attention to page 7, lines 25-26 and page 7, lines 31-32. The text immediately above is found in the application as filed.

The Applicants are merely trying to clean up the specification so that duplicative text, due to a secretarial error, is deleted so that the application reads mores clearly. No new matter is being added as the matter that is being removed is already in the original application at page 7, lines 19-24 and the text underlined is in the original application on page 7, lines 25-26 and 31-32. The Applicants have taken care that no new matter has been added. The Applicants respectfully request the Examiner to withdraw this objection.

2. Rejection under 35 U.S.C. 112, first paragraph

The Examiner rejected claim 10 under 35 U.S.C. 112, first paragraph because the use of "sorbate" in line 4 of claim 10 appears to introduce new matter. The Applicant has corrected the inadvertent reversal of the order of sorbate and sorbitol in claim 10, on line 4. The Examiner's attention is directed to the specification on page 11, lines 32-36 where trimethylolpropane trioleate-sorbital-sorbate (TMOSS) is disclosed as an exemplary inventive compound. Therefore, this objection is now rendered moot.

3. Rejections under 35 U.S.C. 112, second paragraph

The Examiner rejected claims 1-36 as being indefinite under 35 U.S.C. 112, second paragraph for failing to particularly point out and distinctly claim the subject matter of the invention.

The Examiner rejected claims 2, 12, 21 and 29 because it was unclear whether a comma "," should be inserted before "cyclopentene." For reasons of clarity unrelated to patentability, the Applicants have inserted a semicolon ";" before "cyclopentene" in claims 2, 12, 21 and 29. The Examiner has suggested that Applicants delete the parenthesis "(" ")" for clarity. For reasons of clarity unrelated to patentability, the

Applicants have followed the Examiner's suggestion and deleted the parenthesis "(" ")" in claims 2, 12, 21 and 29. Therefore, this rejection is now rendered moot.

The Examiner rejected claims 3, 13, 22 and 30 as being indefinite and duplicating claims 1, 11, 20 and 28, respectively. For reasons of clarity unrelated to patentability, the Applicants have cancelled claims 3, 13, 22 and 30, without prejudice to refile. Therefore, this rejection is now rendered moot.

The Examiner rejected claims 4, 14, 23 and 31 as being indefinite and confusing because the species "tetrahydrophthalic anhydride, tetrahydrophthalic acid, acrylic acid, acrylic anhydride and C₁₋₁₀ alkyl, C₂-C₁₀ alkenyl, or C₁₋₁₀ derivatives of the foregoing acids and anhydrides and combinations thereof" allegedly are not chemically consistent with the description of the second moiety. In order to further expedite prosecution, Applicants have deleted the following compounds, without prejudice to re-file in a continuing application, from the claims: tetrahydrophthalic anhydride, tetrahydrophthalic acid, acrylic acid and acrylic anhydride. Therefore, this rejection is now rendered moot.

4. Rejections under 35 U.S.C. § 103(a)

The Examiner rejected claims 1-19 and 36 under 35 U.S.C. § 103(a) as being unpatentable over Kaza et al (4,574,057) in view of Urushibata et al (5,304,316) and Lindemann (3,322,703), claims 20-35 under 35 U.S.C. § 103(a) as being unpatentable over Kaza in view of Urushibata, Lindemann and Zehler (4,601,840). The Applicants respectfully traverse this rejection.

Applicants submit that the subject matter of these claims is not obvious over Kaza alone or in combination of references because the Examiner has cited non-analogous prior art. The Applicants respectfully direct the Examiner's attention to MPEP Section 2141(a) wherein the inapplicability of non-analogous art when making a rejection to the claims under 35 U.S.C. 103 is discussed. The prior art which can be considered in determining obviousness is that in the inventor's field of endeavor and in analogous arts. *Lamont v. Berguer* (BPAI 1988) 7 USPQ2d 1580; *In re Deminski*, 796 F.2d 436 (Fed. Cir. 1986); 230 USPQ 313. A reference is non-analogous art if it is neither within the inventor's field of endeavor nor reasonably pertinent to the particular problem with which

the inventor was involved. *In re Paulson*, 30 F.3d 1475 (Fed. Cir. 1994); 31 USPQ2d 1671. In the present application, one of the problems the applicants seek to solve is the "need in the art for lubricity additives that impart needed lubricity properties but provide minimal ash or preferably ash-less properties for the purposes of reducing ultimate pollution and emission characteristics" generally in the context of motor oil and similar anti-wear formulations. Page 2, lines 5-8. Kaza is directed to "synthetic resins suitable for printing ink compositions and to processes for their production." Column 1, lines 12-14. Simply put, the inventor of the Kaza patent was attempting to make better printing ink. Printing ink is far removed from motor oils and similar anti-wear compounds. Further, Kaza in no way addresses the problem of lubricity, ashless properties, and pollution and emission characteristics. For at least these reasons, Applicants respectfully request that the Kaza reference be withdrawn from the obviousness analysis.

Similarly, Urushibata and Lindemann are non-analogous prior art and should not be considered in determining whether the present claims are obvious. Urushibata relates to a de-inking compound and does not offer solutions for the problems of lubricity, pollutions, and emissions. A de-inking compound is also not within the field of endeavor of an applicant looking at motor oils and similar anti-wear compounds. Lindemann is directed to "remoistenable adhesive materials and gummed sheet materials and gummed products having an adhesive coating capable of developing adhesive tackiness when moistened with water" (Column 1, lines 11-14); particularly, the invention is directed to "gummed labels, postage stamps, and envelopes" (Column 1, lines 31-32). Again, gummed labels and postage stamps in no way addresses the problem of lubricity, pollution, and emissions that the applicants here sought to address and solve. For at least these reasons, Applicants respectfully request that these references be withdrawn from the obviousness analysis.

Applicants respectfully assert that the combination of references is improper if one of the references is non-analogous art. *In re Clay* (CAFC 1992) 966 F.2d 656, 23 USPQ 2d 1058. Applicants respectfully assert the combination of Kaza, Urushibata and Lindemann is an improper combination of non-analogous art and therefore do not render the present claims obvious.

Applicants also submit that the subject matter of these claims is not obvious over Kaza alone or in combination of references because the Examiner has provided no motivation for making this combination, as required by MPEP 2142-2144. These sections of the MPEP specifically establish the requirement that there must be a suggestion or motivation to modify the cited references to support a rejection for obviousness. As stated in the MPEP:

"[o]bviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art." (MPEP 2143.01, quoting from *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q. 2d 1596 (Fed. Cir. 1988).

Further, MPEP 2143.01 citing *In re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990):

"[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." (emphasis in the original).

These MPEP sections are in accord with numerous well-established precedents. *In re Geiger*, 815 F. 2d 686, 2 U.S. P. Q. 2d 1271 (Fed. Cir. 1987); *N.V. Akzo v. E.I. du Pont de Nemours*, 810 F.2d 1148, 1 U.S. P.Q. 2d 1704 (Fed. Cir 1987); *In re Farrell*, 853 F.2d 894, 7 U.S.P.Q. 2d 1673 (Fed. Cir. 1988). Kaza discloses a reaction of five different species, (a), (b), (c), (d) and (e). It does not, however, teach or disclose either a two step reaction or a Diels-Alder reaction. The specification of the present application clearly discloses that the first moiety and the second moiety are involved in the Diels-Alder reaction. Claim 11 explicitly recites the formation of an intermediate adduct "in a Diels-Alder reaction." The Diels-Alder reaction does not take place in Kaza; nor does Kaza specify two species that need to be reacted together first in a two step reaction. Similarly, Urushibata and Lindemann both fail to disclose the claimed Diels Alder reaction. Additionally, Urushibata does not teach or disclose the second moiety in the present application. The present application requires the second moiety to contain a carboxylic acid or anhydride component. In any event, there is no teaching

or suggestion in any of the Kaza, Urushibata and Lindemann patents that provide motivation for the combination of references. Applicants respectfully request withdrawal of the rejection under 35 U.S.C. § 103(a) and allowance of claims 1-19 and 36.

The Examiner rejected claims 20-35 under 35 U.S.C. § 103(a) as being unpatentable over Kaza in view of Urushibata, Lindemann and Zehler. The Applicants respectfully traverse this rejection.

The Examiner asserts that "Zehler teaches and discloses a lubricant composition comprising a base oil carrier and other conventional additives and a non-phosphorous friction modifier compound..." It is emphasized that a reference cannot be combined with non-analogous art. Therefore, it is improper to combine Zehler with Kaza, Urushibata and Lindemann. Further, Zehler focused on mist lubricants "comprised of certain relatively high viscosity synthetic esters and a combination of polyisobutylene polymers of differing molecular weights." Column 2 lines 40-43. The high viscosity synthetic esters and polyisobutylene polymers disclosed in Zehler do not render obvious the anti-wear lubricant additives as claimed in the present application. Zehler does not teach or disclose the first, second and third moieties. Zehler does not teach or disclose a reaction among the three moieties. Zehler does not teach a Diels-Alder reaction between the first and second moieties. Applicants respectfully request withdrawal of the rejection under 35 U.S.C. § 103(a) and allowance of claims 20-35.

5. CONCLUSION

Attached hereto is a marked up version of the changes made to the claims by the current amendment.

Therefore, at least for the above reasons, the Applicants respectfully assert that the present invention is novel unobvious over any of the above patents. Applicant respectfully assert that this application in condition for allowance and requests further action commensurate thereon.

The Examiner is invited to contact the undersigned attorney at (206) 628-7634 to discuss any matters pertaining to the present application.

Respectfully submitted,



Vita G. Conforti
Registration No. 39,639
Attorney for Applicant

DAVIS WRIGHT TREMAINE LLP
1501 Fourth Avenue
Seattle, WA 98101
(206) 628-7634

Version with Markings to Show Changes Made**IN THE CLAIMS**

Please cancel claim 3, without prejudice.

Please cancel claim 13, without prejudice.

Please cancel claim 22, without prejudice.

Please cancel claim 30, without prejudice.

2. (Amended) The anti-wear compound of claim 1 wherein the unsaturated synthetic base oil or the unsaturated synthetic dieneophilic base oil is selected from the group consisting of unsaturated C_{12} - C_{50} alkenes, C_{12} - C_{50} dienes, naphthenic petroleum base stocks; unsaturated liquid oligomers and polymers, unsaturated polyalphaolefins, unsaturated polyacrylates, unsaturated dehydrated polyol esters; unsaturated C_{10} - C_{24} branched or straight chain fatty acids; unsaturated fatty esters having a branched or straight chain mono- or polyunsaturated C_{10} - C_{24} fatty acid esterified to a C_1 - C_{24} straight or branched, saturated or unsaturated alcohol; unsaturated fatty glycol esters having a mono- or polyunsaturated C_{10} - C_{24} branched or straight chain fatty acid esterified to one or more hydroxyl sites of a polyol [(] selected from ethyleneglycol, polyethyleneglycol, propyleneglycol, polypropyleneglycol, polyethoxylated alcohols, trimethylolpropane, pentaerythritol, dimethylolpropane, dipentaerythritol, and trimethylolethane [)] ; cyclopentene, cyclopentadiene, cyclohexene, cyclohexadiene, 3-pyrroline; substituted benzene, substituted toluene, substituted xylene, substituted quinone, substituted naphthalene, substituted anthracene, substituted pyrrole, substituted furan, substituted thiophene, substituted pyridine, substituted pyrimidine, substituted imidazole, substituted thiazole; X_1 -ester-linked benzoic acid, X_1 -ester-linked benzyl, X_1 - ester-linked naphthenic, X_1 -ester-linked phenol; a branched or straight chain mono- or polyunsaturated C_{10} - C_{24} fatty acid; and combinations thereof, wherein the substitution is a mono- or polyunsaturated C_2 - C_{25} branched or straight chain alkenyl, wherein X_1 - ester-linked is C_2 - C_{24} straight or branched carboxylic acid side chains or a C_1 - C_{24} straight or branched, saturated or unsaturated alcohols.

4. (Twice Amended) The anti-wear compound of claim 3 wherein the second moiety is selected from a group consisting of sorbic acid, sorbic anhydride,

[tetrahydrophthalic anhydride, tetrahydrophthalic acid,] salicylic acid, salicylic anhydride, [acrylic acid, acrylic anhydride,] C_{1-10} alkyl, C_{2-10} alkenyl, or C_{1-10} alkoxy derivatives of the foregoing acids and anhydrides, and combinations thereof.

10. (Five times Amended) The anti-wear compound of claim 1 wherein the anti-wear compound is made from the first moiety, second moiety and third moiety compounds selected from the group consisting of respectively in order for each anti-wear compound trimethylol propane trioleate-sorbic acid-sorbitol, trimethylol propane trioleate-[sorbate]-sorbitol-sorbate, and trimethylol propane trioleate-sorbic acid-hydroquinone.

12. (Amended) The anti-wear compound of claim 11 wherein the unsaturated synthetic base oil or the unsaturated synthetic dieneophilic base oil is selected from the group consisting of unsaturated $C_{12}-C_{50}$ alkenes, $C_{12}-C_{50}$ dienes, naphthenic petroleum base stocks; unsaturated liquid oligomers and polymers, unsaturated polyalphaolefins, unsaturated polyacrylates, unsaturated dehydrated polyol esters; unsaturated $C_{10}-C_{24}$ branched or straight chain fatty acids; unsaturated fatty esters having a branched or straight chain mono- or polyunsaturated $C_{10}-C_{24}$ fatty acid esterified to a C_1-C_{24} straight or branched, saturated or unsaturated alcohol; unsaturated fatty glycol esters having a mono- or polyunsaturated $C_{10}-C_{24}$ branched or straight chain fatty acid esterified to one or more hydroxyl sites of a polyol [() selected from ethyleneglycol, polyethyleneglycol, propyleneglycol, polypropyleneglycol, polyethoxylated alcohols, trimethylolpropane, pentaerythritol, dimethylolpropane, dipentaerythritol, and trimethylolethane []] ; cyclopentene, cyclopentadiene, cyclohexene, cyclohexadiene, 3-pyrroline; substituted benzene, substituted toluene, substituted xylene, substituted quinone, substituted naphthalene, substituted anthracene, substituted pyrrole, substituted furan, substituted thiophene, substituted pyridine, substituted pyrimidine, substituted imidazole, substituted thiazole; X_1 -ester-linked benzoic acid, X_1 -ester-linked benzyl, X_1 - ester-linked naphthenic, X_1 -ester-linked phenol; a branched or straight chain mono- or polyunsaturated $C_{10}-C_{24}$ fatty acid; and combinations thereof, wherein the substitution is a mono- or polyunsaturated C_2-C_{25} branched or straight chain alkenyl, wherein X_1 - ester-linked is C_2-C_{24} straight or branched carboxylic acid side chains or a C_1-C_{24}

straight or branched, saturated or unsaturated alcohols.

14. (Twice Amended) The anti-wear compound of claim 13 wherein the second moiety is selected from a group consisting of sorbic acid, sorbic anhydride, [tetrahydrophthalic anhydride, tetrahydrophthalic acid,] salicylic acid, salicylic anhydride, [acrylic acid, acrylic anhydride,] C_{1-10} alkyl, C_{2-10} alkenyl, or C_{1-10} alkoxy derivatives of the foregoing acids and anhydrides, and combinations thereof.

21. (Amended) The anti-wear supplement composition for addition to lubricant formulas of claim 20, wherein the unsaturated synthetic base oil or the unsaturated synthetic dieneophilic base oil is selected from the group consisting of unsaturated C_{12} - C_{50} alkenes, C_{12} - C_{50} dienes, naphthenic petroleum base stocks; unsaturated liquid oligomers and polymers, unsaturated polyalphaolefins, unsaturated polyacrylates, unsaturated dehydrated polyol esters; unsaturated C_{10} - C_{24} branched or straight chain fatty acids; unsaturated fatty esters having a branched or straight chain mono- or polyunsaturated C_{10} - C_{24} fatty acid esterified to a C_1 - C_{24} straight or branched, saturated or unsaturated alcohol; unsaturated fatty glycol esters having a mono- or polyunsaturated C_{10} - C_{24} branched or straight chain fatty acid esterified to one or more hydroxyl sites of a polyol [(] selected from ethyleneglycol, polyethyleneglycol, propyleneglycol, polypropyleneglycol, polyethoxylated alcohols, trimethylolpropane, pentaerythritol, dimethylolpropane, dipentaerythritol, and trimethylolethane [)] ; cyclopentene, cyclopentadiene, cyclohexene, cyclohexadiene, 3-pyrroline; substituted benzene, substituted toluene, substituted xylene, substituted quinone, substituted naphthalene, substituted anthracene, substituted pyrrole, substituted furan, substituted thiophene, substituted pyridine, substituted pyrimidine, substituted imidazole, substituted thiazole; X_1 -ester-linked benzoic acid, X_1 -ester-linked benzyl, X_1 - ester-linked naphthenic, X_1 -ester-linked phenol; a branched or straight chain mono- or polyunsaturated C_{10} - C_{24} fatty acid; and combinations thereof, wherein the substitution is a mono- or polyunsaturated C_2 - C_{25} branched or straight chain alkenyl, wherein X_1 -ester-linked is C_2 - C_{24} straight or branched carboxylic acid side chains or a C_1 - C_{24} straight or branched, saturated or unsaturated alcohols.

23. (Twice Amended) The anti-wear compound of claim 22 wherein the

second moiety is selected from a group consisting of sorbic acid, sorbic anhydride, [tetrahydrophthalic anhydride, tetrahydrophthalic acid,] salicylic acid, salicylic anhydride, [acrylic acid, acrylic anhydride,] C_{1-10} alkyl, C_{2-10} alkenyl, or C_{1-10} alkoxy derivatives of the foregoing acids and anhydrides, and combinations thereof.

29. (Amended) The crankcase oil formulation of claim 28, wherein the unsaturated synthetic base oil or the unsaturated synthetic dieneophilic base oil is selected from the group consisting of unsaturated $C_{12}-C_{50}$ alkenes, $C_{12}-C_{50}$ dienes, naphthenic petroleum base stocks; unsaturated liquid oligomers and polymers, unsaturated polyalphaolefins, unsaturated polyacrylates, unsaturated dehydrated polyol esters; unsaturated $C_{10}-C_{24}$ branched or straight chain fatty acids; unsaturated fatty esters having a branched or straight chain mono- or polyunsaturated $C_{10}-C_{24}$ fatty acid esterified to a C_1-C_{24} straight or branched, saturated or unsaturated alcohol; unsaturated fatty glycol esters having a mono- or polyunsaturated $C_{10}-C_{24}$ branched or straight chain fatty acid esterified to one or more hydroxyl sites of a polyol [() selected from ethyleneglycol, polyethyleneglycol, propyleneglycol, polypropyleneglycol, polyethoxylated alcohols, trimethylolpropane, pentaerythritol, dimethylolpropane, dipentaerythritol, and trimethylolethane [)] ; cyclopentene, cyclopentadiene, cyclohexene, cyclohexadiene, 3-pyrroline; substituted benzene, substituted toluene, substituted xylene, substituted quinone, substituted naphthalene, substituted anthracene, substituted pyrrole, substituted furan, substituted thiophene, substituted pyridine, substituted pyrimidine, substituted imidazole, substituted thiazole; X_1 -ester-linked benzoic acid, X_1 -ester-linked benzyl, X_1 - ester-linked naphthenic, X_1 -ester-linked phenol; a branched or straight chain mono- or polyunsaturated $C_{10}-C_{24}$ fatty acid; and combinations thereof, wherein the substitution is a mono- or polyunsaturated C_2-C_{25} branched or straight chain alkenyl, wherein X_1 - ester-linked is C_2-C_{24} straight or branched carboxylic acid side chains or a C_1-C_{24} straight or branched, saturated or unsaturated alcohols.

31. (Twice Amended) The crankcase oil formulatin of claim 28 wherein the second moiety is selected from a group consisting of sorbic acid, sorbic anhydride, [tetrahydrophthalic anhydride, tetrahydrophthalic acid,] salicylic acid, salicylic anhydride,

[acrylic acid, acrylic anhydride,] C₁₋₁₀ alkyl, C₂₋₁₀ alkenyl, or C₁₋₁₀ alkoxy derivatives of the foregoing acids and anhydrides, and combinations thereof.

36. (Amended) An anti-wear compound comprising:

reacting a first moiety with a second moiety in a molar ratio of from about 1:2 to about 2:1 at a temperature of from about 22°C to about 320°C under an inert atmosphere to form an intermediate adduct;

esterifying the intermediate adduct with a third moiety in a molar ratio of from about 1:2 to about 2:1 wherein the first moiety is an unsaturated synthetic base oil or an unsaturated synthetic dieneophilic base oil, the second moiety is a structure having a diene conjugated carbon-carbon double bond and a carboxylic acid or anhydride moiety, and the third moiety is a polyhydroxy compound and wherein the anti-wear compound is made from the first moiety, second moiety and third moiety compounds selected from the group consisting of respectively in order for each anti-wear compound trimethylol propane trioleate-[maleic anhydride]sorbic acid-sorbitol, trimethylol propane trioleate-[maleic anhydride]sorbitol-sorbate, and trimethylol propane trioleate-[maleic anhydride]sorbic acid-hydroquinone.